

Comprehensive Test Series-07

Complex Numbers and Quadratic Equations

TIME: 1 hr.

MM:40

General Instructions:

- All Questions are compulsory.
 - Marks are given along with the questions individually.
 - Use of calculator is not permitted.
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Q.1 If $(3x - 7) + 2iy = -5y + (5+x) i$, where x and y are real numbers, then find the values of x and y . (3)

Q.2 Evaluate $\left[i^{17} - \left(\frac{1}{i} \right)^{34} \right]^2$ (3)

Q.3 Convert the complex number $z = \frac{i-1}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$ in the polar form. (4)

Q.4 Convert in the polar form $\frac{1+7i}{(2-i)^2}$ (4)

Q.5 If $(x + iy)^{1/3} = a + ib$, prove that $\frac{x}{a} + \frac{y}{b} = 4(a^2 - b^2)$ (3)

Q.6 $a + ib = \sqrt{\frac{1+i}{1-i}}$ show that $a^2 + b^2 = 0$ (3)

Q.7 Find the multiplicative inverse of the complex numbers. (3)
 $4 - 3i$

Q.8 Find the multiplicative inverse of the complex numbers: (3)
 $(1 + i\sqrt{3})^2$

Q.9 Find the conjugates of the complex numbers: (4)
 $\frac{(1+i)(2+i)}{3+i}$

Q.10 Express the complex numbers in the standard form $a + ib$ (3)
 $\frac{1}{(2+i)^2}$

Q.11 Solve $x^2 + x + \frac{1}{\sqrt{2}} = 0$ (3)

Q.12 If α and β are different complex number with $|\beta| = 1$, then find $\left| \frac{\beta - \alpha}{1 - \alpha\beta} \right|$ (4)